

What is claimed is:

1. A system for permitting orderly shutdown of electronic components, the system comprising:

- 5           an enclosure;  
            one or more electronic components positioned within the enclosure;  
            at least one fan positioned within the enclosure for generating an airflow across  
the one or more electronic components;  
            a heat exchanger for cooling the airflow; and  
10          a phase change material for absorbing heat from the airflow upon a failure  
associated with the heat exchanger.

2. The system according to claim 1, wherein the phase change material has a phase  
change temperature that is above a temperature of the airflow when there is no failure  
15 associated with the heat exchanger, and below a maximum operating temperature of the  
one or more electronic components.

3. The system according to claim 1, wherein the heat exchanger is a fluid to air heat  
exchanger.

20 4. The system according to claim 3, wherein the fluid to air heat exchanger is coupled  
to a fluidic circuit.

5. The system according to claim 4, wherein the fluidic circuit circulates one of a  
25 refrigerant and water.

6. The system according to claim 1, wherein the heat exchanger is a thermoelectric  
device.

30 7. The system according to claim 1, wherein the phase change material is enclosed in a  
heat conductive container.

8. The system according to claim 7, wherein the container includes fins.

9. The system according to claim 1, wherein the phase change material is in micro-encapsulated form that is embedded in a coating applied to one or more surfaces within the enclosure.
- 5 10. The system according to claim 1, wherein one or more surfaces within the enclosure is coated with the phase change material, the phase change material encapsulated by a sealing coat.
11. The system according to claim 1, further comprising:
- 10 a temperature sensor for sensing temperature within the enclosure; and  
a high-temperature indication indicative of a high temperature within the enclosure, the high temperature being lower than a phase change temperature of the phase change material.
- 15 12. The system according to claim 1, wherein the phase change material is a material chosen from the group of materials consisting of a paraffin, a hydrated salt, a metal, an alloy, and an organic acid.
13. The system according to claim 1, wherein the at least one fan substantially
- 20 recirculates air within the enclosure.
14. The system according to claim 1, wherein the one or more electronic components includes at least one blade server.
- 25 15. A method for cooling one or more electronic components positioned in an enclosure, the method comprising;
- providing an air cooling element within the enclosure;  
generating an airflow across the cooling element and one or more electronic components positioned within the enclosure; and
- 30 cooling the airflow using a phase change material upon a failure in the cooling element, the phase change material positioned within the enclosure.
16. The method according to claim 15, wherein providing the air cooling element includes:

moving fluid through a fluidic circuit, the fluidic circuit including a fluid to air heat exchanger.

17. The method according to claim 16, further comprising pumping one of a water and a  
5 refrigerant through the fluidic circuit.

18. The method according to claim 15, wherein the air cooling element is a thermoelectric device.

10 19. The method according to claim 15, further comprising providing an indication indicative of a high temperature condition within the enclosure.

20. The method according to claim 15, further including shutting down the one or more electronic components upon a failure in the fluidic circuit.

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21. The method according to claim 15, wherein the phase change material has a melting point that is above a temperature of the airflow when there is no failure in the air cooling element, and below a maximum operating temperature of the one or more components.

20 22. The method according to claim 15, further comprising enclosing the phase change material in a container.

23. The method according to claim 15, further comprising encapsulating the phase change material in a surface positioned within the airflow.

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24. The method according to claim 15, further comprising:  
applying the phase change material to a surface positioned within the airflow, and  
applying a sealing coat on top of the phase change material.

30 25. The method according to claim 15, wherein the one or more electronic components includes at least one blade server.

26. A cooling system comprising:  
an enclosure;

one or more electronic components positioned in the enclosure;  
means for generating an airflow across the one or more electronic components;  
cooling means for cooling the airflow; and  
a phase change material positioned in the airflow, the phase change material for  
5 absorbing heat from the airflow upon a failure in the cooling means.

27. The cooling system according to claim 26, wherein the means for generating the  
airflow includes a fan.

10 28. The cooling system according to claim 26, wherein the cooling means includes a  
fluid to air heat exchanger.

29. The cooling system according to claim 28, wherein the fluid to air heat exchanger is  
coupled to a fluidic circuit that circulates one of a refrigerant and a water.

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30. The cooling system according to claim 26, wherein the cooling means includes a  
thermoelectric device.

31. The cooling system according to claim 26, wherein the phase change material is  
20 enclosed in a container.

32. The cooling system according to claim 31, wherein the container includes fins for  
dissipating heat.

25 33. The cooling system according to claim 26, wherein the phase change material is  
encapsulated in a surface positioned within the airflow.

34. The cooling system according to claim 26, wherein one or more surfaces within the  
enclosure is coated with the phase change material, the phase change material  
30 encapsulated by a sealing coat.

35. The cooling system according to claim 26, wherein the phase change material is a  
material chosen from the group of materials consisting of a paraffin, a hydrated salt, a  
metal, an alloy, and an organic acid.

36. The method according to claim 26, wherein the one or more electronic components includes at least one blade server.